NIH NATIONAL CANCER INSTITUTE

METHOD OF TREATING SILICOSIS AND OTHER OCCUPATIONAL LUNG DISEASES

SUMMARY

The National Cancer Institute seeks partners interested in collaborative research to license unique methods of treating silicosis using oligodinucleotides (ODN).

REFERENCE NUMBER

E-182-2008

PRODUCT TYPE

- Therapeutics

KEYWORDS

- silicosis, ODN, oligodinucleotide
- occupational lung disease
- pulmonary inflammation
- nanotechnology

COLLABORATION OPPORTUNITY

This invention is available for licensing.

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DESCRIPTION OF TECHNOLOGY

The inhalation of dust containing crystalline silica particles causes silicosis, an incurable lung disease that progresses even after dust exposure ceases. Over a million US workers are exposed to silica dust annually, and thousands worldwide die each year from silicosis. The pulmonary inflammation caused by silica inhalation is characterized by a cellular infiltrate and the accumulation of chemokines, cytokines, and Reactive Oxygen Species (ROS) in bronchoalveolar lavage fluid. Macrophages are the predominant immune cell type present in alveolar spaces. The uptake of silica particles by macrophages triggers the production of ROS (including hydrogen peroxide) via the oxidative stress pathway, which in turn contributes to pulmonary damage and macrophage death.

One strategy for limiting the production of pro-inflammatory cytokines and ROS after silica exposure involves treatment with "suppressive" oligonucleotides (ODN). Suppressive ODN express motifs based on the repetitive TTAGGG hexamers present at high frequency in the telomeric ends of self DNA.

Researchers at NCI's Laboratory of Experimental Immunology methods for treating, preventing, or reducing the risk of developing occupational lung diseases using ODN treatment. Preclinical *in vivo* studies show that pre-treatment with suppressive ODN reduces silica-dependent pulmonary inflammation, and also showed that treatment with suppressive ODN also reduced disease severity and improved the survival of mice exposed to silica.

POTENTIAL COMMERCIAL APPLICATIONS

- A treatment for silicosis and other occupational lung diseases
- As a pre-treatment in high-risk groups to either prevent or reduce the risk of developing occupational lung diseases

COMPETITIVE ADVANTAGES

- No currently available treatment for silicosis or occupational lung disease

INVENTOR(S)

Dennis Klinman (NCI) and T. Sato

DEVELOPMENT STAGE

- Pre-clinical (in vivo)

PUBLICATIONS

T Sato et al. J Immunol. 2008 Jun 1;180(11):7648-7654. [PubMed abs]

PATENT STATUS

- **U.S. Issued:** US 8,222,225 Issued 17 July 2012

THERAPEUTIC AREA

- Cancer/Neoplasm
- Immune System and Inflammation